PTO/SB/97 (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Certificate of Transmission under 37 CFR 1.8

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office

on 12/27/2004.
Date

Charles Johnson
Signature

Christine Johnson 38,507
Typed or printed name of person signing Certificate

Note: Each paper must have its own certificate of transmission, or this certificate must identify each submitted paper.

Item: Appeal Brief 29 pages including appendix (9 pages)
Serial No.: 09/803,249
Docket No.:PU010047
Art Unit: 2675
Examiner: Anyaso, Uchendu O

Ser. No. 09/803,249

PU010047

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applicant	:	Donald Henry Willis
Serial No.	:	09/803,249
Filed	:	March 9, 2001
For	:	REDUCING SPARKLE ARTIFACTS WITH LOW BRIGHTNESS PROCESSING
Examiner	:	Anyaso, Uchendu O
Art Unit	:	2675

APPEAL BRIEF

May It Please The Honorable Board:

This is Appellants' Brief on Appeal from the final rejection of claims 1 – 25. Please charge the $$330.00 fee for filing this Brief to Deposit Account No. 07-0832.

Please charge any additional fee or credit overpayment to the above-indicated Deposit Account. Enclosed are three copies of the Brief.

I. REAL PARTY IN INTEREST

The real party in interest of Application Serial No. 09/803,249 is :

THOMSON Multimedia Licensing Inc.

II. RELATED APPEALS AND INTERFERENCES

Applicant has filed one notice of appeal on a pending application (Application Serial No. 09/803,248) related in subject matter to the present application. Applicant intends to file an Appellants' Brief on Appeal from the final rejection of claims 1,2, 5-12, and 14-29 for Application Serial No 09/803,248 before the expiration of the time allotted for said filing.

III. STATUS OF THE CLAIMS

Claims 1-25 are rejected and the rejection of claims 1-25 are appealed.

IV. STATUS OF AMENDMENTS

All amendments were entered and are reflected in the claims included in Appendix I.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 is directed to a method for reducing sparkle artifacts (defined in applicants published specification **20020126080** in paragraph 11) due to non linearity in a transfer function of a liquid crystal imager (See, for example, paragraph 11 of published application). The method comprises the steps of low pass filtering (as for example by low pass filter 22 illustrated in Fig. 1 and in more detail in Fig. 3 at 22) only a first lower brightness level signal component (as for example denoted in Figs. 1 and 2 by "LOW1" and described in applicants published specification in paragraph 36) of a video signal (as described in applicant's specification, for example, in paragraph 32 and denoted by X in applicants drawing figures 1 and 2). Only a second lower brightness level signal component (for example LOW 2 illustrated in Fig. 1) of the video signal having the low pass filtered signal component (illustrated in Fig 1 denoted by X') is slew rate limited (See applicant's published application paragraph 39). The video signal having the low pass filtered and the slew rate limited signal components is less likely to result in sparkle artifacts in the imager. (paragraph 22, applicant's published specification)

Claim 2 is directed to the method recited in claim 1 and comprises the steps of decomposing (for example by first decomposer 12 in Fig. 1) the video signal (illustrated in Fig. 1 at X) into the first lower brightness level signal component (LOW 1 of Fig. 1) and a higher brightness level signal (denoted HIGH1 in Fig. 1) component prior to the low pass filtering (as for example by low pass filter 22 of Fig. 1). The low pass filtered first lower brightness level signal component (designated by LOWf in Fig. 1) and the higher brightness

level signal component are combined (for example by adder 26 of Fig. 1) prior to the slew rate limiting.

Claim 3 is directed to the method recited in claim 2, and comprises the step of delay matching the higher brightness level signal component (as by delay match circuit 24 having signal HIGH1 as an input and signal HIGH1d as an output) with the low pass filtered lower first brightness level signal component (indicated as LOWf) prior to the combining step.

Claim 4 is directed to the method recited in claim 1 and comprises the steps of decomposing (as by second decomposer 30 of Fig. 1) the video signal (indicated, for example by X' in Fig. 1) having the low pass filtered first lower brightness level signal component. The video signal is decomposed into the second lower brightness level signal component (LOW2 of Fig. 1) and a higher brightness level signal component prior to the slew rate limiting. The slew rate limited second lower brightness level signal component and the higher brightness level signal component are combined (for example in second combiner 40 of Fig. 1) to generate the video signal (for example indicated by X'' in Fig. 2) having the low pass filtered and the slew rate limited signal component

Claim 5 is directed to the method of claim 4, and comprises the step of delay matching (as for example by second delay match 38 of Fig. 1) the higher brightness level signal component (indicated, for example, by HIGH2 in Fig. 2) with the slew rate limited lower brightness level signal component prior to the combining step.

Claim 6 is directed to the method of claim 1, and comprises the steps of decomposing (for example, by decomposer 12 of Fig. 1) the video signal into the first lower brightness level signal component and the first higher brightness level signal component prior to the low pass filtering. The low pass filtered first lower brightness level signal component (LOWf of Fig. 1) and the first higher brightness level signal component (HIGH1d in Fig. 1) are combined prior to the slew rate limiting. The video signal having the low pass filtered first lower brightness level signal component is divided into the second lower brightness level signal component and a second higher brightness level signal component prior to the slew rate limiting. The slew rate limited second lower brightness level signal component (LOWs in Fig. 1) and the second higher brightness level signal component (HIGH 2d) are combined (for example, by combiner 40 of Fig. 1) to generate the video signal (For example, X'' of Fig. 1) having the low pass filtered and the slew rate limited signal components.

Claim 7 is directed to the method of claim 6, comprising the step of supplying the video signal (for example, X'' of Fig. 1) having the low pass filtered and the slew rate limited signal components to a liquid crystal on silicon imager.

Claim 8 is directed to the method of claim 1, and comprises the steps of applying the sparkle reducing steps to a luminance signal for the picture, delaying chrominance signals for the picture, and generating a plurality of video drive signals from the modified luminance signal and the delayed chrominance signals.

Claim 9 is directed to the method of claim 8, comprising the steps of applying the sparkle reducing steps to at least one of the video drive signals and delaying all non-sparkle-reduced video drive signals.

Claim 10 is directed to the method of claim 1, comprising the steps of generating a plurality of video drive signals from luminance and chrominance signals, applying the sparkle reducing steps to at least one of the video drive signals; and delaying all non-sparkle-reduced video drive signals.

Claim 11 is directed to the method of claim 1, comprising the steps of selecting different brightness thresholds for the first and second lower brightness level signal components in accordance with transitions between lower and higher level gain portions of a gamma table associated with the LCOS imager; and selecting slew rate limits in accordance with the gain of the gamma table(See, for example, applicant's published specification paragraph 4).

Claim 12 is directed to an apparatus (as for example illustrated in Fig. 1 at 10) for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising means for low pass filtering (indicated, for example, in Fig. 1 at 22) in only a first lower brightness level signal component (designated in Fig 1 by LOW1)of a video signal (at X in Fig. 1); and means for slew rate limiting (for example as indicated at 36 of Fig. 1) only a second lower brightness level signal component (for example indicated by LOW 2) of the video signal having the low pass filtered signal component (represented, for example, by X'in Fig. 1). The video signal having the low pass filtered and the slew rate limited signal components (for example as represented by X'' in Figs 1 and 2)is less likely to result in sparkle artifacts in the imager.

Claim 13 is directed to the apparatus of claim 12, comprising means for decomposing (decomposer 12 of Fig.1) the video signal into the first lower brightness level signal component and a first higher brightness level signal component prior to the low pass filtering;

means for combining (for example, combiner 26 in Fig.1) the low pass filtered first lower brightness level signal component and the first higher brightness level signal component prior to the slew rate limiting, means for dividing (unit 226 of Fig. 3)the video signal having the low pass filtered first lower brightness level signal component into the second lower brightness level signal component and a second higher brightness level signal component prior to the slew rate limiting; and, means for combining the slew rate limited second lower brightness level signal component and the second higher brightness level signal component to generate the video signal having the low pass filtered and the slew rate limited signal components.

Claim 14 is directed to the apparatus of claim 13, comprising means for delay matching (for example, first delay match 24 of Fig. 1) the first higher brightness level signal component(HIGH1 of Fig. 1) with the low pass filtered first lower brightness level signal component (LOWf) prior to the first-recited combining step; and means for delay matching (second delay match 38 of Fig. 1) the second higher brightness level signal component with the slew rate limited second lower brightness level signal component prior to the second-recited combining step.

Claim 15 is directed to the apparatus of claim 12, comprising means for delaying chrominance signals for the picture; and, means for generating a plurality of video drive signals from a luminance signal having the low pass filtered and the slew rate limited signal components and the delayed chrominance signals.

Claim 16 is directed to the apparatus of claim 12, wherein: different brightness thresholds for the first and second lower brightness level signal components are selectable in accordance with transitions between lower and higher level gain portions of a gamma table associated with the imager; and, slew rate limits are selectable in accordance with the gain of the gamma table (See, for example, applicant's published specification paragraph 4).

Claim 17 is directed to the apparatus of claim 12, wherein the means for low pass filtering has a normalized 1:2:1 Z-transform frequency characteristic.

Claim 18 is directed to the apparatus of claim 12, wherein the imager is a liquid crystal on silicon imager.

Claim 19 is directed to an apparatus (as for example illustrated in Fig. 1 at 10)for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising: a low pass filter for processing only a first lower brightness level signal component of a video signal (as for example denoted in Figs. 1 and 2 by "LOW1" and

described in applicants published specification in paragraph 36); and, a slew rate limiter (for example as indicated at 36 of Fig. 1) for processing only a second lower brightness level signal component (LOW2 of Fig. 1) of the video signal having the low pass filtered signal component, the video signal having the low pass filtered and the slew rate limited signal components (X'' of Figs 1 and 3) being less likely to result in sparkle artifacts in the imager.

Claim 20 is directed to the apparatus of claim 19, comprising: a first decomposer (indicated at 12 of Figs 1 and 2) for dividing the video signal (X of Figs 1 and 2) into the first lower brightness level signal component and a first higher brightness level signal component prior to the low pass filter processing; a first algebraic unit (indicated at 26 of Fig. 1) for combining the low pass filtered first lower brightness level signal component and the first higher brightness level signal component prior to the slew rate limit processing; a second decomposer (indicated at 30 of Fig. 1) for dividing the video signal (represented by X'in Fig.1) having the low pass filtered first lower brightness level signal component into the second lower brightness level signal component (LOW2 of Fig. 1) and a second higher brightness level signal component (HIGH2 of Fig. 1) after the combining and prior to the slew rate limit processing; and, a second algebraic unit (indicated at 40 of Fig. 1) for combining the slew rate limited second lower brightness level signal component and the second higher brightness level signal component to generate the video signal (X'' of Fig. 1) having the low pass filtered and the slew rate limited signal components.

Claim 21 is directed to the apparatus of claim 20, comprising: a first delay match circuit (indicated, for example, at 24 of Fig. 1) for delaying the first higher brightness level signal component (for example HIGH1 of Fig. 1) prior to the combining with the low pass filtered first lower brightness level signal component; and, a second delay match circuit (for example indicated at 38 of Fig. 1) for delaying the second higher brightness level signal component (HIGH2 of Fig. 1) prior to the combining with the slew rate limited second lower brightness level signal component.

Claim 22 is directed to the apparatus of claim 21, and comprises a delay matching circuit (for example indicated at 24 of Fig. 1) for delaying chrominance signals for the picture and a color space converter for generating a plurality of video drive signals from a luminance signal having the low pass filtered and the slew rate limited signal components and the delayed chrominance signals.

Claim 23 is directed to the apparatus of claim 19, wherein different brightness thresholds for the first and second lower brightness level signal components (LOW1 and

LOW2 of Fig. 1) are selectable in accordance with transitions between lower and higher level gain portions of a gamma table associated with the imager. (See, for example, applicant's published specification paragraph 4)The slew rate limits are selectable in accordance the gain of the gamma table.

Claim 24 is directed to the apparatus of claim 21, wherein the low pass filter has a normalized 1:2:1 Z-transform frequency characteristic.

Claim 25 is directed to the apparatus of claim 21, wherein the imager is a liquid crystal on silicon imager.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Regarding independent claims 1, 12 and 19 applicant appeals the action of the office rejecting claims 1, 12 and 19 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) with respect to the specific grounds cited by the examiner that "Okada teaches a means for dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal (column 2, lines 17-33)"
2. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action that "Okada teaches a means for dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal (column 2, lines 17-33)".
3. Regarding claims 1-25 applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the examiner that "Okada teaches a split low pass filter (10, 11) arrangement and a delay matching circuit (15, 16, 18) wherein the low-pass filters (10, 11) are for independently low pass filtering rising transients and falling transients in said low brightness signal to reduce adjacent pixel interdependence, and the delay matching circuit for the high brightness signal

(figures 1, 2 at 10, 11, 15, 16, 18, column 7, lines 5-16, figure 3 at S7; column 3, lines 4-13;)"

4. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the examiner that "Mihara teaches shows how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see* also column 4, lines 23-27)"

5. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) because the examiner has failed to meet the requisite burden of providing a reason why one of ordinary skill in the art would be motivated to combine Okada and Mihara to arrive at the invention claimed in applicant's claims 1-25 and therefore has not made out a prima facie case of obviousness.

6. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) because the examiner has failed to meet the requisite burden of providing a reason why one of ordinary skill in the art would be motivated to combine the disclosures of Okada, Mihara and Carlson to arrive at applicant's claimed invention and therefore has not made out a prima facie case of obviousness.

7. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action reproduced verbatim as follows: "However, Okada and Mihara do not teach a means for providing the brightness signals and the slew rate limited signal to provide an output that reduces sparkle artifacts. On the other hand, Carlson teaches this concept by teaching how low-pass filters are coupled in a cascade through a summer wherein the first of the filters is associated with a lower subspectra and the second filter is associated with

a higher subspectra (column 18, lines 29-49, figure 2a; *see also* column 8, lines 24-62, figure 2a) such that sparkle is suppressed (column 13, lines 46-50)".

8. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action that "Carlson teaches a method of reducing sparkle artifacts due to non linearity in a transfer function by teaching an image processing system using narrow-band coring such that filtering after coring suppresses sparkle (column 13, lines 46-50)"

9. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action "it would have been obvious to a person of ordinary skill in the art to combine Okada, Mihara and Carlson because while the combination of Okada and Mihara teaches the concept of dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal and then slew rate limiting one of the signals (column 2, lines 17-33), Carlson teaches the method sparkle suppression (column 13, lines 46-50; column 18," lines 29-49,figure 2a; see also column 8, lines 24-62, figure 2a). The motivation for combining these inventions would have been to achieve noise reduction without the introduction of noticeable artifacts in a display image (see Abstract)".

10. Regarding claims 8 and 9, in further discussion of claim 1, applicant appeals the rejection of claims 8 and 9 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230), inter alia, on the specific grounds cited by the office action that "Thus, it would have been obvious to a person of ordinary skill in the art to combine Okada, Mihara, Carlson and Jang because while the combination of Okada, Mihara and Carlson how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see also* column 4, lines 23-27) and a method of reducing sparkle artifacts, Jang teaches a video signal processing circuit of a CCD-type color video camera that includes a gamma correction circuit, delay circuit, a chrominance signal processor and luminance signal processor (see

Abstract; column 3, lines 26-45, figure 3 at 20).. The motivation for combining these inventions would have been to improve the picture quality of a video device (column 2, lines 28-32).

VII. ARGUMENT

1. Regarding independent claims 1, 12 and 19 applicant appeals the action of the office rejecting claims 1, 12 and 19 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) with respect to the specific grounds cited by the examiner that "Okada teaches a means for dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal (column 2, lines 17-33)". The rejection is in error because the alleged teaching of Okada does not correspond to any feature recited in applicant's claims 1, 12 and 19, therefore the rejection fails to make the requisite factual findings as to how the alleged teachings of the prior art are to be applied to meet the specific requirements of claims 1, 12 and 19.

2. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action that "Okada teaches a means for dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal (column 2, lines 17-33)" for the following reasons.
    a. First, the examiner errs in relying on Okada's disclosure of "means for dividing light" as teaching or suggesting applicant's features relating to decomposing video signals because the reference describes a light dividing means, and then only in the context of an optical subsystem. Optics is a non analogous art. The dividing means of the Okada reference is described by Okada (abstract) as follows: "A beam splitter divides light reflected by the surface of the object into two parts. Each of the divided parts of the light is passed through an optical filter whose transmission wavelength range is set according to the colors of the object, to adjust the quantity of transmitted light

from a high-brightness part of the object surface and the quantity of transmitted light from a low-brightness part of the object surface to a reference level."

b. The principles of engineering and physics applicable to dividing visible light into light beams using beamsplitters, (the science of optics) are not applicable to the task of decomposing a video signal into video signal components. Okada lacks any teaching that the term "light" should be given any meaning other than its ordinarily understood meaning, that is "radiant energy that is capable of exciting the retina" (The New IEEE Standard Dictionary of Electrical and Electronics Terms, The Institute of Electrical and Electronics Engineers, Inc., 1993, page 714.) The term "video signal" as commonly understood and as described in applicants specification, for example, in paragraph 32: "The video signal is a digital signal, and the waveform is a succession of digital samples representing brightness levels." One of ordinary skill in the art would not be motivated to provide a video signal to an optical dividing means such as a beamsplitter so as to decompose the video signal into high and low brightness level video signal components prior to low pass filtering. One of ordinary skill in the art would not expect success in such a combination. Therefore, there is no motivation to combine a teaching of an optical subsystem designed to divide visible light into light beams with any other reference to arrive at applicant's claimed invention.

c. Finally, even considering, arguendo, the teaching of Okada regarding dividing means to be analogous art, the examiner errs on this ground of rejection because no reference contains a teaching, suggestion or incentive which would have led one of ordinary skill in the art to modify or combine the optical light dividing subsystem of Okada with the teaching of Mihara or Carlson to arrive at applicant's claimed invention. It would be technically impossible and non feasible to modify such an optical sub-system so that it could decompose a video signal into components in a way that would meet the requirements of applicant's claims. This fact, in and of itself, is a disincentive to the artisan to do so. In addition, the purpose for which the Okada optical subsystem is intended (dividing light reflected from the surface of an object to be inspected) is not normally present in the

environment in which applicant's apparatus is operated. Therefore, the artisan would not have been motivated by Okada, Mihara Carlson, or any other reference, taken alone or in combination, to combine the light dividing features described in Okada with any another reference in such a manner as to meet the terms of applicant's claims reciting decomposing video signals.

d. Second, the examiner errs in this ground of rejection by relying on impermissible hindsight and applicant's own disclosure in interpreting the reference as disclosing or suggesting "means for dividing a signal", when in fact the reference describes only "means for dividing light." Further, in this context, the reference describes "brightness"solely as it relates to a high or low brightness part of the object surface. The examiner's conclusion that such a description of dividing light reflected from a high or low brightness part of an object surface teaches or suggests a decomposer for decomposing a video signal into high or low brightness level video signal components is so overreaching it could only have been postulated using impermissible hindsight gleaned from reading applicant's specification describing "decomposing video signals" and "brightness level video signal components".

e. Accordingly, no portion of the cited reference includes a teaching of "dividing means" sufficient to provide a basis for an obviousness rejection of any of applicant's claims 1-25.

3. Regarding claims 1-25 applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the examiner that "Okada teaches a split low pass filter (10, 11) arrangement and a delay matching circuit (15, 16, 18) wherein the low-pass filters (10, 11) are for independently low pass filtering rising transients and falling transients in said low brightness signal to reduce adjacent pixel interdependence, and the delay matching circuit for the high brightness signal (figures 1, 2 at 10, 11, 15, 16, 18, column 7, lines 5-16, figure 3 at S7; column 3, lines 4-13;)". The examiner errs in making this specific grounds for rejection for the following reasons.

a. First, contrary to the examiner's assertion, Okada does not teach that the low pass filters (10, 11) are for "independently low pass filtering rising transients and falling transients in said low brightness signal to reduce adjacent pixel

interdependence" as alleged by the examiner. Such an interpretation contradicts the actual disclosure of Okada. Okada specifically describes the cited low pass filters illustrated at 10 and 11 are for **filtering noise** from amplified image signals A2 and B2. (See Okada col 4 lines 52 -59 " In step S3, the low-pass filters 10 and 11 remove noise components from the amplified image signals A2 and B2 and provide image signals A3 and B3, respectively. ")

b. Second, applicant's claims lack any corresponding filter having the purpose conjectured by the examiner. Applicant's claims recite a low pass filter that operates only on a low brightness level signal component of a video signal. Okada, on the other hand, describes that both filters 10, 11 are applied to both of the amplified image signals A2 and B2. According to Okada (see, for example, Figure 1) the amplified image signals A2 and B2 taken together comprise the entire image signal to be processed. Thus, there is no disclosure in Okada of using low pass filters 10 and 11 to filter "only a lower brightness level signal component of a video signal." Okada describes the light reflected from the object should be equalized before forming an image signal. See for example, Okada col. 2 lines 30-37. Okada states, **"In this way, the quantities of the transmitted light** from the high- and low-brightness parts of the object surface are equalized, **and the image pick-up means simultaneously pick up the images** of the high- and low-brightness parts of the object at the same positional relations and **photoelectrically convert the images into electric image signals."** Okada further states amplifiers 8 and 9 are adjusted to have equal output signal levels. " In step S2, the object kind presetting unit PS controls amplification factors of the amplifiers 8 and 9 so that output signal levels of the amplifiers 8 and 9 will be equal to each other once the quantity of light from the white part of the capsule transmitted through the optical filter 4 and the quantity of light from the red part of the capsule transmitted through the optical filter 5 are adjusted to the reference level. Thus, Okada describes that image signals A1 and B1 are equal with respect to the high and low brightness parts of the object. -

4. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of

Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the examiner that "Mihara teaches shows how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see* also column 4, lines 23-27)" because Mihara lacks any teaching or suggestion to slew rate limit signals.

a. The cited column 4 lines 23 - 27 recites: "By the method as described in the above example the part *[of the waveform of the measured analog signal]*, where the slew rate of the waveform [*of the measured analog signal*] is high, is displayed darkly [*on the waveform displaying device*] and the part, where the slew rate is low, is displayed brightly *[on the waveform displaying device]*." Therefore, Mihara describes displaying a waveform differently [displaying darkly, or displaying lightly], based on slew rate of the signal to be represented by the waveform. There is no teaching in Mihara to slew rate limit a signal or a waveform.

b. The cited abstract of Mihara describes, "A waveform displaying device, in which a measured analogue signal is converted into a digital signal by means of an analogue to digital converter and thereafter the digital signal is directly inputted in a display device (19) such as a raster scanning display, a liquid crystal display device, effecting the display while controlling the brightness of pixels **so as to reproduce to display waveform of the measured analogue signal.** In the present device the brightness of pixels is varied **depending on slew rate** of the waveform, so that the **brightness of interpolation lines is increased**, when differences between inputted waveform data are small, and the brightness is decreased, when the differences are small."

c. A teaching to increase the brightness of interpolation lines in portions of a waveform where the represented signal has a high slew rate is not a teaching of slew rate limiting any signal or waveform. Therefore, it can be readily appreciated by a close reading of the above cited portions of the Mihara specification that no teaching of slew rate limiting a signal, or of a slew rate limiter, is provided by Mihara.

5. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247;169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) because the

examiner has failed to meet the requisite burden of providing a reason why one of ordinary skill in the art would be motivated to combine Okada and Mihara to arrive at the invention claimed in applicant's claims 1-25 and therefore the examiner has not made out a prima facie case of obviousness.

a. In rejecting applicant's claims, the examiner states what he believes (albeit erroneously) the references teach, "Thus, it would have been obvious to a person of ordinary skill in the art to combine Okada and Mihara because while Okada teaches a means for dividing an input signal into a high-brightness and low-brightness part and low-pass filters (10, 11) for independently low pass filtering rising transients and falling transients in said low brightness signal, Mihara teaches shows how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see also* column 4, lines 23-27).

b. The examiner then provides no more than a conclusory statement regarding general motivations in the art to provide excellent waveform display devices, "The motivation for combining these inventions would have been to provide an excellent waveform display device capable of efficiently displaying large quantity of data (column 2, lines 20-25)." First, such a motivation would not be likely to result in any combination of references that meet applicant claim limitations, therefore there could not be expectation of success. Further, such conclusory statements of vague and general motivation fails to provide the requisite factual findings as to how the alleged teachings of Okada and Mihara could be applied to meet the specific requirements of applicants claims. "[C]onclusory statements'as to teaching, suggestion or motivation to arrive at the claimed invention "do not adequately address the issue of obviousness." In re Lee, 277 F.3d 1338, 1343-44, 61 USPQ2d 1430, 1433 (Fed Cir. 2002).

6. Regarding claims 1-25 applicant appeals the action of the office rejecting claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) because the examiner has failed to meet the requisite burden of providing a reason why one of ordinary skill in the art would be motivated to combine the disclosures of Okada, Mihara and Carlson to arrive at applicant's claimed invention and therefore has not made out a prima facie case of obviousness.

7. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action reproduced verbatim as follows: "However, Okada and Mihara do not teach a means for providing the brightness signals and the slew rate limited signal to provide an output that reduces sparkle artifacts. On the other hand, Carlson teaches this concept by teaching how low-pass filters are coupled in a cascade through a summer wherein the first of the filters is associated with a lower subspectra and the second filter is associated with a higher subspectra (column 18, lines 29-49, figure 2a; *see also* column 8, lines 24-62, figure 2a) such that sparkle is suppressed (column 13, lines 46-50)" for the following reasons.
    a. First, the phrase "this concept" in the examiner's assertion lacks a clear antecedent basis and applicant is unable to determine what concept the examiner believes is taught by the Carlson reference that provides the requisite motivation to combine the teachings of Okada and Mihara, and further Carlson. As a result the examiner's statement fails to provide any basis for rejection sufficiently clear to afford the applicant a fair opportunity to make a coherent response.
    b. Second, a stated teaching, "... how low-pass filters are coupled in a cascade through a summer wherein the first of the filters is associated with a lower subspectra and the second filter is associated with a higher subspectra (column 18, lines 29-49, figure 2a; *see also* column 8, lines 24-62, figure 2a) is a teaching so far removed from applicant's claimed invention that neither applicant, nor one of ordinary skill in the art, would be able to determine any relationship at all between the alleged teaching and applicant's claims.
    c. Therefore the rejection fails to make the requisite factual findings as to how the alleged teachings of the prior art are to be applied to meet the specific requirements of applicant's claims.
    d. Further, the examiner's assertion that the forgoing filters described in the Carlson reference are arranged "such that sparkle is suppressed" (column 13, lines 46-50)" is not a teaching found anywhere in the cited reference. In stating that the filters are arranged to the said effect, the examiner impermissibly borrows words, concepts and phrases from applicants

specification and uses these to interpret the teaching of the reference. Such a practice constitutes the use of impermissible hindsight. Fourth, the examiners interpretation of the teaching using said borrowed words taken from applicant's specification fails to define any technically comprehensible feature since there is no teaching that such a filter arrangement is related to the phenomena of sparkle artifacts due to non linearity in liquid crystal imagers.

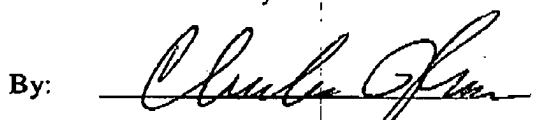
8. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action that "Carlson teaches a method of reducing sparkle artifacts due to non linearity in a transfer function by teaching an image processing system using narrow-band coring such that filtering after coring suppresses sparkle (column 13, lines 46-50)" for the following reasons. First, the Carlson reference contains no teaching or suggestion that filtering after coring suppresses sparkle. Second, the examiner uses impermissible hindsight to interpret the reference to arrive at applicants claimed invention. Third, the examiner employs words phrases and concepts found solely in applicants specification in such a way as to arrive at a statement of the teaching of Carlson in direct contradiction to Carlson's explicit teachings. Accordingly, applicant requests appellate review of this specific grounds for rejection.
9. Regarding claims 1-25, applicant appeals the rejection of claims 1-25 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230) on the specific grounds cited by the office action "it would have been obvious to a person of ordinary skill in the art to combine Okada, Mihara and Carlson because while the combination of Okada and Mihara teaches the concept of dividing an input signal into a plurality of signals having at least a high brightness signal and a low brightness signal and then slew rate limiting one of the signals (column 2, lines 17-33), Carlson teaches the method sparkle suppression (column 13, lines 46-50; column 18," lines 29-49,figure 2a; see also column 8, lines 24-62, figure 2a). The motivation for combining these inventions would have been to achieve noise reduction without the introduction of noticeable artifacts in a display image (see Abstract)" for the following reasons. First the recited grounds for rejection provide no more than a recitation of what the examiner (incorrectly) believes each reference teaches and as such it fails to provide

any reason why one of ordinary skill in the art would modify or combine the cited references to meet the features of applicant's claims. The motivation cited by the examiner "to achieve noise reduction without the introduction of noticeable artifacts in a display image (see Carlson Abstract)" is taken from the Carlson reference describing Carlson's own invention. It does not amount to a suggestion to modify or combine an optical light dividing subsystem (Okada) with an oscilloscope displaying a signal waveform (Mihara) to arrive at applicants claimed features for processing video signals so as to reduce sparkle artifacts in a liquid crystal imager. The skilled artisan would have no reasonable expectation of success in making such a combination because applicant's claimed invention could not be technically accomplished by any modification or combination of the references. The rejection fails to make the requisite factual findings as to how the alleged teachings of the prior art are to be applied to meet the specific requirements of applicant's claims. Therefore, the examiner has failed to make out a prima facie case for obviousness.

10. Regarding claims 8 and 9, applicant appeals the rejection of claims 8 and 9 as unpatentable under 35 U.S.C. 103(a) over Okada et al.(U.S. 5,247,169) in view of Mihara (EP 0457497), and further in view of Carlson (U.S.4,523,230), inter alia, on the specific grounds cited by the office action that "Thus, it would have been obvious to a person of ordinary skill in the art to combine Okada, Mihara, Carlson and Jang because while the combination of Okada, Mihara and Carlson how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see also* column 4, lines 23-27) and a method of reducing sparkle artifacts, Jang teaches a video signal processing circuit of a CCD-type color video camera that includes a gamma correction circuit, delay circuit, a chrominance signal processor and luminance signal processor (see Abstract; column 3, lines 26-45, figure 3 at 20).. The motivation for combining these inventions would have been to improve the picture quality of a video device (column 2, lines 28-32). Applicant appeals this grounds for rejection for the following reasons. First, for all the reasons cited above with regard to the teachings of Okada, Mihara and Carlson. Second, the combination of Okada, Mihara and Carlson do not teach "how to slew rate limit signals in varying rates and then displaying the signals *(see* Abstract; *see also* column 4, lines 23-27)" as alleged by the examiner. Third, the examiner's statements amount to no more than a summary of what the examiner believes (albeit erroneously) each of the cited references

separately teach. The mere fact that the prior art structure could be modified does not make such a modification obvious unless the prior art suggests the desirability of doing so. In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). A general statement that a motivation exists in the art "to improve the picture quality of video devices" fails to provide an adequate reason why one of ordinary skill in the art would be motivated to combine the teachings of the cited references to arrive at applicant's claimed invention. "[C]onclusory statements' as to teaching, suggestion or motivation to arrive at the claimed invention "do not adequately address the issue of obviousness." In re Lee, 277 F.3d 1338, 1343-44, 61 USPQ2d 1430, 1433 (Fed Cir. 2002). Further, the teachings of the cited references are such that it would not be technically feasible or desirable to modify or combine these teachings to arrive at applicant's claimed invention.

Respectfully submitted,
Donald Henry Willis

By: 

Christine Johnson, Attorney
Registration No. 38,507
(609) 734-6892

Patent Operations
Thomson Licensing Inc.
P.O. Box 5312
Princeton, NJ 08543-5312

December 27, 2004

APPENDIX I - APPEALED CLAIMS

Claim 1. A method for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising the steps of:

low pass filtering only a first lower brightness level signal component of a video signal; and,

slew rate limiting only a second lower brightness level signal component of said video signal having said low pass filtered signal component,

said video signal having said low pass filtered and said slew rate limited signal components being less likely to result in sparkle artifacts in said imager.

Claim 2. The method of claim 1, comprising the steps of:

decomposing said video signal into said first lower brightness level signal component and a higher brightness level signal component prior to said low pass filtering; and,

combining said low pass filtered first lower brightness level signal component and said higher brightness level signal component prior to said slew rate limiting.

Claim 3. The method of claim 2, comprising the step of delay matching said higher brightness level signal component with

said low pass filtered lower first brightness level signal component prior to said combining step.

Claim 4. The method of claim 1, comprising the steps of:

decomposing said video signal having said low pass filtered first lower brightness level signal component into said second lower brightness level signal component and a higher brightness level signal component prior to said slew rate limiting; and,

combining said slew rate limited second lower brightness level signal component and said higher brightness level signal component to generate said video signal having said low pass filtered and said slew rate limited signal component.

Claim 5. The method of claim 4, comprising the step of delay matching said higher brightness level signal component with said slew rate limited lower brightness level signal component prior to said combining step.

Claim 6. The method of claim 1, comprising the steps of:

decomposing said video signal into said first lower brightness level signal component and a first higher brightness level signal component prior to said low pass filtering;

combining said low pass filtered first lower brightness level signal component and said first higher brightness level signal component prior to said slew rate limiting;

dividing said video signal having said low pass filtered first lower brightness level signal component into said second lower brightness level signal component and a second higher brightness level signal component prior to said slew rate limiting; and,

combining said slew rate limited second lower brightness level signal component and said second higher brightness level signal component to generate said video signal having said low pass filtered and said slew rate limited signal components.

Claim 7. The method of claim 6, comprising the step of supplying said video signal having said low pass filtered and said slew rate limited signal components to a liquid crystal on silicon imager.

Claim 8. The method of claim 1, comprising the steps of:

applying said sparkle reducing steps to a luminance signal for said picture;

delaying chrominance signals for said picture; and,

generating a plurality of video drive signals from said modified luminance signal and said delayed chrominance signals.

Claim 9. The method of claim 8, comprising the steps of:

applying said sparkle reducing steps to at least one of said video drive signals; and,

delaying all non-sparkle-reduced video drive signals.

Claim 10. The method of claim 1, comprising the steps of:

generating a plurality of video drive signals from luminance and chrominance signals;

applying said sparkle reducing steps to at least one of said video drive signals; and,

delaying all non-sparkle-reduced video drive signals.

Claim 11. The method of claim 1, comprising the steps of:

selecting different brightness thresholds for said first and second lower brightness level signal components in accordance with transitions between lower and higher level gain portions of a gamma table associated with said LCOS imager; and,

selecting slew rate limits in accordance with the gain of said gamma table.

Claim 12. An apparatus for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising:

means for low pass filtering only a first lower brightness level signal component of a video signal; and,

means for slew rate limiting only a second lower brightness level signal component of said video signal having said low pass filtered signal component,

said video signal having said low pass filtered and said slew rate limited signal components being less likely to result in sparkle artifacts in said imager.

Claim 13. The apparatus of claim 12, comprising:

means for decomposing said video signal into said first lower brightness level signal component and a first higher brightness level signal component prior to said low pass filtering;

means for combining said low pass filtered first lower brightness level signal component and said first higher brightness level signal component prior to said slew rate limiting;

means for dividing said video signal having said low pass filtered first lower brightness level signal component into said second lower brightness level signal component and a second higher brightness level signal component prior to said slew rate limiting; and,

means for combining said slew rate limited second lower brightness level signal component and said second higher

brightness level signal component to generate said video signal having said low pass filtered and said slew rate limited signal components.

Claim 14. The apparatus of claim 13, comprising:

means for delay matching said first higher brightness level signal component with said low pass filtered first lower brightness level signal component prior to said first-recited combining step; and,

means for delay matching said second higher brightness level signal component with said slew rate limited second lower brightness level signal component prior to said second-recited combining step.

Claim 15. The apparatus of claim 12, comprising:

means for delaying chrominance signals for said picture; and,

means for generating a plurality of video drive signals from a luminance signal having said low pass filtered and said slew rate limited signal components and said delayed chrominance signals.

Claim 16. The apparatus of claim 12, wherein:

different brightness thresholds for said first and second lower brightness level signal components are selectable in

accordance with transitions between lower and higher level gain portions of a gamma table associated with said imager; and,

slew rate limits are selectable in accordance with the gain of said gamma table.

Claim 17. The apparatus of claim 12, wherein said means for low pass filtering has a normalized 1:2:1 Z-transform frequency characteristic.

Claim 18. The apparatus of claim 12, wherein said imager is a liquid crystal on silicon imager.

Claim 19. An apparatus for reducing sparkle artifacts due to non linearity in a transfer function of a liquid crystal imager, comprising:

a low pass filter for processing only a first lower brightness level signal component of a video signal; and,

a slew rate limiter for processing only a second lower brightness level signal component of said video signal having said low pass filtered signal component,

said video signal having said low pass filtered and said slew rate limited signal components being less likely to result in sparkle artifacts in said imager.

Claim 20. The apparatus of claim 19, comprising:

a first decomposer for dividing said video signal into said first lower brightness level signal component and a first higher brightness level signal component prior to said low pass filter processing;

a first algebraic unit for combining said low pass filtered first lower brightness level signal component and said first higher brightness level signal component prior to said slew rate limit processing;

a second decomposer for dividing said video signal having said low pass filtered first lower brightness level signal component into said second lower brightness level signal component and a second higher brightness level signal component after said combining and prior to said slew rate limit processing; and,

a second algebraic unit for combining said slew rate limited second lower brightness level signal component and said second higher brightness level signal component to generate said video signal having said low pass filtered and said slew rate limited signal components.

Claim 21. The apparatus of claim 20, comprising:

a first delay match circuit for delaying said first higher brightness level signal component prior to said combining with said low pass filtered first lower brightness level signal component; and,

a second delay match circuit for delaying said second higher brightness level signal component prior to said combining with said slew rate limited second lower brightness level signal component.

Claim 22. The apparatus of claim 21, comprising:

a delay matching circuit for delaying chrominance signals for said picture; and,

a color space converter for generating a plurality of video drive signals from a luminance signal having said low pass filtered and said slew rate limited signal components and said delayed chrominance signals.

Claim 23. The apparatus of claim 19, wherein:

different brightness thresholds for said first and second lower brightness level signal components are selectable in accordance with transitions between lower and higher level gain

portions of a gamma table associated with said imager; and,

slew rate limits are selectable in accordance the gain of said gamma table.

Claim 24. The apparatus of claim 21, wherein said low pass filter has a normalized 1:2:1 Z-transform frequency characteristic.

Claim 25. The apparatus of claim 21, wherein said imager is a liquid crystal on silicon imager.